

## JOINT DIRECT ATTACK MUNITION (JDAM)



### Air Force/Navy ACAT ID Program

Total Number of Systems:	62,000 Air Force 25,500 Navy
Total Program Cost (TY\$):	\$2590.9M
Average Unit Cost (TY\$):	\$20K (Est.)
Full-rate production:	2QFY01

### Prime Contractor

Boeing-St. Louis, MO

### SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Joint Direct Attack Munition (JDAM) is a low cost, autonomously controlled, adverse weather accurate guidance kit for the Air Force/Navy 2,000-pound MK-84 and BLU-109 general-purpose bombs and the 1,000-pound MK-83 bomb. There are no planned design changes to the bombs (casing metallurgy, explosive fill, fusing mechanism, etc.), but the existing inventory weapons will be configured with JDAM guidance kits and accessories. The guidance is accomplished via a Global Position System (GPS) aided Inertial Navigation System. Actual weapon launch will occur when the aircrew has flown the aircraft into the weapon Launch Acceptability Region (LAR). The LAR is the three-dimensional area in space in which the weapon may be released to fly directly to a selected target on a pre-determined bearing.

The JDAM kit will yield delivery accuracy of 13 meters when GPS is available and less than 30 meters when GPS is absent or jammed. JDAM is designed to be employed by a variety of fighter/attack and bomber aircraft, allowing *precision engagement* from all altitudes under adverse environmental

conditions. The primary aircraft for integration of the 2,000-pound JDAM will be the B-52H and the F-18C/D. The 1,000-pound JDAM will be tested and integrated on the F-18C/D, AV-8B, and F-22.

## **BACKGROUND INFORMATION**

JDAM was designated a Pilot Program in accordance with the Federal Acquisition Streamlining Act of 1994, which authorizes relief from numerous DOD regulatory requirements. However, Title 10 OT&E and LFT&E statutory requirements have not been waived. JDAM successfully completed a Milestone I review in October 1993 and entered an 18-month DEM/VAL source selection phase (McDonnell Douglas vs. Lockheed Martin). In October 1995, the Air Force selected McDonnell Douglas Aerospace as the winning JDAM contractor for Phase II EMD and production. Selection was based on overall performance, design, and cost. JDAM was removed from OSD live fire oversight in November 1993. The lethality and survivability of both the Mk-84 and BLU-109 bomb bodies were well documented.

In fall 1994, USD(A&T) approved a plan to accelerate the JDAM program by approximately 18 months to get precision guided munitions into the field at the earliest possible date. The April 1997 JDAM LRIP decision approved the procurement of 937 MK-84 and BLU-109 2,000-pound kits in Lot 1, representing approximately 1 percent of the total planned buy. In January 1998, USD(A&T) approved the delay of Milestone III to 3QFY99, and added a second LRIP for JDAM. In May 1998, the LRIP II decision approved the procurement of 2,202 additional 2,000-pound MK-84 kits. In December 1998, USD(A&T) approved delay of Milestone III until 1QFY00, due to investigation of a bending fatigue problem discovered in the high-speed, low to medium altitude environment, resulting in cracks in the fin shafts in MK-84 tail assemblies carried on the inboard stations of the F/A-18, and added a third LRIP for JDAM. Further delays in completing the development and flight testing of the new pin-lock tail actuator sub-system design necessitated an additional delay for Milestone III. In June 2000, USD(A&T) approved further delay of Milestone III until April 2001, and approved the pin-lock configuration for a fourth LRIP for JDAM. The fourth LRIP will procure an additional 8,163 2000-pound tail kits; 5,073 MK-84; and 3,090 BLU-109 kits. Also, this decision added the F/A-18C/D as a threshold aircraft for the MK-83 due to software development delays for the AV-8B.

## **TEST & EVALUATION ACTIVITY**

Both Air Force and Navy operational test agencies began dedicated OT&E of the 2,000-pound MK-84 and BLU-109 kits in November 1998. Operational testing of friction brake design weapons, including the delivery of 122 MK-84 and BLU-109 weapons from F-18s and B-52s, was completed in August 1999. IOT&E/OPEVAL was completed with testing of ten pin-lock design weapons during the Verification of Correction of Deficiency phase from May-August 2000.

The Navy's F/A-18 served as the threshold fighter and the B-52 served as the threshold bomber during the dedicated IOT&E phase. However, results of concurrent JDAM integration testing on the F-16, B-1, and B-2 will be used to support an informed full-rate production decision. The results of B-2 JDAM deliveries during Operation Allied Force will also be used by DOT&E, as appropriate, to support the Operational Test and Evaluation Report. Integration testing of the 2000-pound JDAM on additional platforms, including the F-14 and F/A-18E/F, began this year.

Developmental testing of MK-83 has begun with ground tests, fit checks, and weapon separation tests. Operational testing of the MK-83 is planned for 2Q01. The scale of testing is expected to be less

than testing for the 2000-pound variants due to the high commonality of already tested components. F-18C/D integration is planned for FY01. Integration and OPEVAL on the AV-8B is scheduled for FY02. Integration testing on the F-22 is planned to begin in FY03.

Planning to adapt the JDAM tail kit to the MK-82 500-pound bomb has begun. Developmental flight test is projected to begin on the F-16 and F-18 in FY02 followed by operational flight test.

## **TEST & EVALUATION ASSESSMENT**

JDAM completed operational testing in August 2000. Results are being analyzed based on data from all operational testing, including the pin-lock verification phase. Detailed test results will be reported in the Operational Test and Evaluation Report in early 2001.

During operational testing, anomalies led to the Air Force decertifying use of the Joint Programmable Fuze (JPF) with the BLU-109 version of JDAM and the Navy decertifying JPF for both the MK-84 and BLU-109. The JDAM/JPF combination did not meet requirements. This impacts JDAM's airborne re-targeting capability due to the inability to change fuze settings of alternative fuzes in flight. Action has begun to resolve this deficiency. Follow-on operational testing will be required when a solution has been developed.

More than 20 JDAMS have been employed in Operation Southern Watch this year. Battle damage accuracy assessment estimates exceed requirements for the weapon impacting the planned target area.

## **CONCLUSIONS, RECOMMENDATIONS AND LESSONS LEARNED**

The sharing of limited resources and assets between multiple test programs led to schedule extension. In particular, for JDAM testing, aircraft programmed and dedicated to the initial operational test allowed for over 120 weapon releases and other test events in a 10-month period. During the pin-lock verification test phase, an unplanned extension of overall operational test, it took nearly four months to accomplish a much smaller data set that included only ten weapon releases. This was due to other programs competing for the same resources, primarily the flight test aircraft F-18C/Ds at China Lake Naval Air Station. The JDAM capable aircraft were deployed for nearly one month in the middle of the test period to support a higher priority test program. To complete the JDAM test, operational aircraft were brought in from the fleet.

